Sulphatizing Roasting of Gold-Containing Slimes

extractions of tellurium into solution being 60 and 30% with alkaline and sulphuric-acid leaching, respectively. The authors attribute the relative ineffectiveness of the latter to the presence of large quantities of silver sulphate and conclude that sulphatizing roasting should be restricted to slimes with less than 10% silver.

SOV/136-59-4-2/24

AUTHOR: Smirnov, V.I., Professor

TITLE: The Help Given to Industry by the Urals Polytechnic Institute in the Domain of Heavy Metals (Pomoshch' kafedry tyazhelykh tsvetnykh metallov Ural'skogo politekhnicheskogo instituta proizvodstvu)

PERIODICAL: Tsvetnyye metally, 1959, Nr 4, pp 4-9 (USSR)

ABSTRACT: The work carried out in 1958 by the Urals Polytechnic Institute in the field of heavy metals is described with particular reference to the close collaboration with industry in the Urals. Two methods developed for the extraction of zinc and rare metals from blast furnace dust residues are given. The dust contains 15 to 45% Fe and 6 to 16% Zn. The first is to mix with a solution of NaOH (250-300 g/l) with a liquid:solid ratio of 7.5:1 at 55-70°C for 30 minutes. 94 to 96% Zn is extracted. The residue consists of approx 25% Fe and up to 15% C. This can be separated magnetically. The zinc is obtained from solution by electrolysis as a voluminous spongy precipitate. It is washed and dried and resulting powder has a high activity. It can be used in the metallurgy of gold and lead. The second method of extracting the zinc

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The Help Given to Industry by the Urals Polytechnic Institute in the Domain of Heavy Metals

is by heating under reducing conditions, when the zinc sublimes with other easily vaporised elements. The clinker is rich in iron. This method is more profitable. Methods are also given for the complex treatment of Ni-Co ores. They are preliminarily roasted at 400°C and treated with sulphuric acid. Na_2S is added and the cobalt precipitated. The laboratory results were confirmed by the Yelizavetinskiy Opytnyy zavod. 80 to 85% Co is extracted. No less than 85% Ni is left in the tailings and this is extracted together with any Fe present by sintering and heating in a blast furnace. The Buruktalskiye ferrous ores gave poor yield by this method. The Buruktalsky magnesia and ferro-magnesia ores gave a higher Co yield with H_2SO_4 but precipitation and filtration after adding Na_2S was extremely slow. On the Ni-Co oxide ores (Yelizavetinskiye) H_2SO_4 has a selective action which enables separation of Co from most of the Ni and nearly all the Fe. On the other ores no such selective action is shown. Alternative

The Help Given to Industry by the Urals Polytechnic Institute in the Domain of Heavy Metals

methods are suggested: extraction of Co and Ni together by ammoniacal solution leaving the Fe behind or extracting all three metals together by treatment in the electric furnace. The extracted metals can then be used in the production of their alloys. Work on the exploitation of new Cu deposits is in progress at the Karabash Copper Smelter with an ore high in Cu and S and containing a little Zn. In spite of the high content of fines (40% with 3-4 mm size) it is possible to use in a shaft furnace. Equipment is needed to extract the zinc from the residues by the fuming process obtaining Zn in the sublimate. The problem of treating residues low in Zn (<5%) obtained at the Krasnouralskiy and Kirovgradskiy works has not yet been solved. Work is in progress and should be completed in 1960.

Card 3/3

Smirnov, V.I.

PHASE I BOOK EXPLOITATION SOV/4601

Koordinatsnoye soveshchaniye po primeneniyu kisloroda na metallurgicheskikh zavodakh Urala. Sverdlovsk, 1956

Primeneniye kisloroda na metallurgicheskikh predpriyatiyakh Urala; materialy koordinatsionnogo soveshchaniya (Use of Oxygen in Metallurgical Plants of the Urals; Materials of the Coordination Conference) Sverdlovsk, 1960. 152 p. Errata slip inserted. 1,000 copies printed.

Sponsoring Agencies: Akademiya nauk SSSR. Ural'skiy filial. Institut metallurgii; Ural'skiye pravleniya nauchno-tekhnicheskikh obshchestv chernoy i tsvetnoy metallurgii.

Resp. Ed.: P.S. Kusakin, Candidate of Technical Sciences; Tech. Ed.: N.F. Seredkina.

PURPOSE: This collection of papers is intended for scientific research and technical personnel in the field of metallurgy.

COVERAGE: The use of oxygen in ferrous and nonferrous metallurgy of the Urals is discussed. Results of experimental use of oxygen in some metallurgical plants are presented. During the Conference, held December 20 and 21, 1956, the following persons (in addition to the authors) took part in the discussion: V.Ya. Miller, V.V. Mikhaylov, P.Ya. Sorokin, A.A. Perestoronin (all affiliated with the Institute of Metallurgy of the Ural Branch AS USSR), S.M. Kazachenko (Nizhne-Saldinskiy metallurgicheskiy zavod - Nizhnyaya-Salda Metallurgical Plant), M.F. Kochin (Deceased) (Ural'skiy institut chernykh metallov - Ural Institute of Ferrous Metals), M.Ya. Kislitsin (Chelyabinskiy metallurgicheskiy zavod - Chelyabinsk Metallurgical Plant), G.V. Demin (Krasnoural'skiy medeplavil'nyy zavod - Krasnoural'sk Copper Smelting Plant), V.A. Aglitskiy (Institut Unipromed' - "Unipromed'" Institute). Some of the papers are followed by references, both Soviet and Non-Soviet.

(20)

APPROVED FOR RELEASE: 08/24/2000 CIA-RDP86-00513R001651610012-8"

GAZARYAN, Levon Martirosovich; SMIRNOV, V.I., akademik, retsenzent; BABADZHAN, A.A., kand.tekhn.nauk, retsenzent; GUDIMA, N.V., red.; EL'KIND, L.M., red.izd-va; KARASEV, A.I., tekhn.red.

[Pyrometallurgy of copper] Pirometallurgiia medi. Moskva, Gos. nauchno-tekhn.izd-vo lit-ry po chernoi i tsvetnoi metallurgii, 1960. 261 p. (MIRA 13:5)

1. AN Kazakhskoy SSR (for Smirnov).
(Copper--Metallurgy)

SMIRNOV, V.I.; PLETNEV, N.F.

Interaction between antimony sulfide with its trioxide in the liquid phase. Trudy Inst.met.UFAN SSSR no.5:109-116 '60. (MIRA 13:8)

(Antimony sulfide) (Antimony oxide)

PLETNEV, N.F.; SMIRNOV, V.I.

Studying the interaction between the sulfide and the oxide of antimony in the vapor phase. Trudy Inst.met.UFAN SSSR no.5:117-122 '60. (MIRA 13:8)
(Antimony sulfide) (Antimony oxide) (Vapor plating)

S/149/60/000/006/004/018
A006/A001

AUTHORS: Filippov, A.A., Smirnov, V.I.

TITLE: On Kinetics and Thermodynamics of Chlorination Reactions of Selenides and Tellurides of Copper and Precious Metals

PERIODICAL: Izvestiya vysshikh uchebnykh zavedeniy, Tsvetnaya metallurgiya, 1960, No. 6, pp. 55-64

TEXT: Chlorination is one of the means of separating selenium and tellurium from non-ferrons and precious metals. It can be used as a technological basis for processing anode slimes and other semiproducts of the metallurgical industry. Due to the low boiling temperatures of selenium and tellurium, their extraction into chloride sublimate will depend on the stability in chlorine atmosphere and the chlorination rate of those compounds in the form of which selenium and tellurium are present in the initial materials. The probable form of Se and Te in anode slimes can be determined from their composition and the magnitude of energy of the crystalline lattice of the compounds. E.S. Sarkisov's method was used to calculate the energy of crystalline lattices of selenides and tellurides of copper, silver, platinum and palladium. A comparison of their values shows that in platinoid

S/149/60/000/006/004/018
A006/A001

On Kinetics and Thermodynamics of Chlorination Reactions of Selenides and Tellurides of Copper and Precious Metals

slimes selenium and tellurium are partially present in the form of selenides and tellurides of platinum and palladium. When studying the thermodynamics of chlorination reactions of selenides and tellurides of copper, silver, platinum and palladium, the possibility and intensity of the reactions is determined from the magnitude and sign of the isobaric-isothermal potential. The authors carried out thermodynamical calculations of changes in the isobaric-isothermal potential of chlorination reactions of selenides and tellurides in a temperature range of 100-500°C, using the equation of first approximation $\Delta Z^{o}_{T} = \Delta H^{o}_{298} - T \Delta S^{o}_{298}$, and data given by A.F. Kapustinskiy (Ref. 13), Venner, Latimer (Ref. 14), and K.B. Yatsimirskiy (Ref. 10). A comparison of values of chlorination reactions, ΔZ, shows that under similar conditions telluride chlorination will prevail, and among the selenides, platinum and palladium will chlorinate least. In the presence of sodium chloride, chlorination reactions of platinum selenide and telluride proceed with the formation of a complex compound Na_2PtCl_6. The chlorination reaction of corresponding compounds of palladium is most probably accompanied by the formation of $PdCl_2$. Kinetics of chlorination reactions was studied with synthetic selenides

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S/149/60/000/006/004/018
A006/A001

On Kinetics and Thermodynamics of Chlorination Reactions of Selenides and Tellurides of Copper and Precious Metals

and tellurides of copper, silver, platinum and palladium. Values of apparent activation energy of the chlorination reaction of these compounds were determined. The rate of chlorination reactions was investigated on an installation shown in Figure 1. A batch of 100 mg selenide or telluride is mixed with sodium chloride and crushed charcoal in a 1:1:1 proportion and put into a quartz boat which was placed in a reaction tube. After evacuating the air from the tube by argon, the electric furnace was switched on. During heating, argon was passed through the tube at a rate of 2 liters/hr. The temperature in the reaction space was measured over the middle of the boat. At a steady temperature, a T-pipe was turned to receive the chlorine which was passed into the reaction tube from a gasmeter at a constant rate of 4.5 liters/hr. Chlorination of selenides lasted from 2 minutes to 4 hours; tellurides were chlorinated for up to 2 hours. Constant values of chlorination reaction rates of selenides and tellurides are calculated by an equation for the reaction of the first order

$$K = \frac{1}{\Delta\tau} - \ln \frac{q_n}{q_k}$$

where q_n and q_k are the amounts of selenide (telluride) after 2 and 15 minutes

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On Kinetics and Thermodynamics of Chlorination Reactions of Selenides and Tellurides of Copper and Precious Metals

chlorination respectively; $\Delta\tau$ is a period of 13 minutes during which a change in weight of the substance from q_n to q_k takes place. Figure 3 shows the logarithm of the experimental constant of the chlorination reaction rate of selenides and tellurides as a function of the inverse value of absolute temperature. The experimental points for each reaction are well located on the straight line whose formula corresponds to the Arrenius equation

$$\ln K = -\frac{A}{T} + B$$

where A is the tangent of the inclination angle of the straight line to the abscissa axis - $\frac{1}{T}$ connected with the activation energy by the equation $E = AR$. The experiments show that tellurides of copper platinum and palladium and copper selenides are unstable compounds and are affected by chlorine already at 80-100°C. At 200-250°C the chlorination reaction is practically completed within 30 to 60 minutes. Chlorination reaction of selenide and telluride of silver begins at 200°C and is completed at 300°C. Platinum and palladium selenides are most stable in chlorine atmosphere and their interaction begins at 250 and 300°C respectively.

S/149/60/000/006/004/015
A006/A001

On Kinetics and Thermodynamics of Chlorination Reactions of Selenides and Tellurides of Copper and Platinum Metals

[illegible] chlorination is [illegible] at 450-500°C. For a series of selenides, such as [illegible], Ag2Se, PtSe, Cu2Se and a number of tellurides, such as Ag2Te, PtTe, Cu2Te, a [illegible] was determined [illegible] the apparent activation energy and the thermal effect of reaction chlorination: [illegible] H. A connection was established between the values of crystalline lattice energy and activation energy of chlorination reaction of selenide and telluride of the same metal. A higher value of activation energy of the chlorination reaction corresponds to a higher value of the crystalline lattice energy.

[illegible]

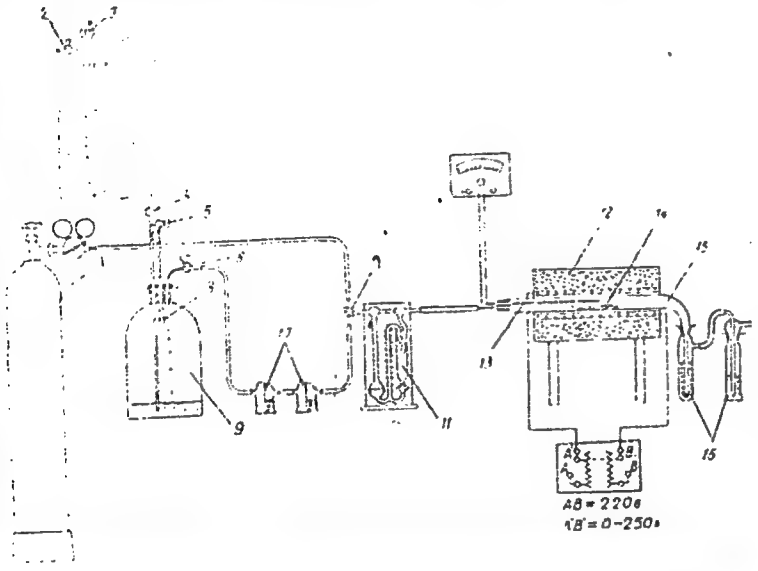

Figure 1: Schematic diagram of an installation for studying the chlorination reaction rates of selenides and tellurides. 1-cylinder with argon; 2-3,4,5,6,7-taps; 8-overflow container; 9-20l cylinder with NaCl solution; 10-vials with concentrated H_2SO_4; 11-rheometer designed by Leybovskiy (Ref. 19); 12-electric furnace; 13-platinum platinum-rhodium thermocouple; 14-quartz boat; 15-heat resistant glass tube; 16-containers with HCl solution.

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A006/A001

On Kinetics and Thermodynamics of Chlorination Reactions of Selenides and Tellurides of Copper and Precious Metals

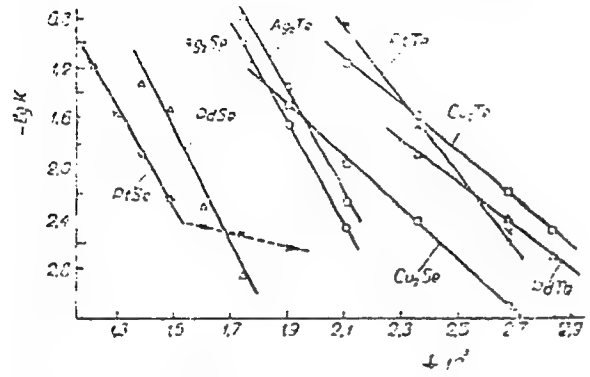

Figure 3: Dependence of the logarithm of the constant of chlorination reaction rate of selenides and tellurides of copper, silver, platinum and palladium on the inverse value of absolute temperature.

There are 6 tables and 3 figures and 21 references: 17 Soviet and 4 English.

ASSOCIATION: Ural'skiy politekhnicheskiy institut (Ural Polytechnic Institute); Kafedra metallurgii tyazhelykh tsvetnykh metallov (Department of Metallurgy of Heavy Non-Ferrous Metals)

[illegible]: May 9, 1960

SMIRNOV, V.I.; ARKHIPOVA, M.S.; KHUDYAKOV, I.F.

Investigation of slags from the fire refining of nickel-copper and methods of treating them. Trudy Ural. politekh. inst. no.98: 16-23 '60. (MIRA 14:3)

(Copper—Metallurgy) (Slag)

POLUKAROV, N.A.; SMIRNOV, V.I.

Behavior of selenium and tellurium during the sulfatizing roasting of the pulp. Trudy Ural. politekh. inst. no.98:24-32 '60.
(MIRA 14:3)
(Selenium--Metallurgy) (Tellurgium--Metallurgy)

KLYUYEVA, A.V.; SMIRNOV, V.I.

Effecient method of analyzing the products of copper smelting for types of metal compounds. Trudy Ural. politekh. inst. no.98: 59-66 '60. (MIRA 14:3)
(Copper—Metallurgy) (Copper compounds—Analysis)

SYAO CHZHI-TSAYN [Hsiao Chih-tsang]; SMIRNOV, V.I.; SRYVALIN, I.T.

Thermodynamics of the sulfatizing roast processes of converter slags in a fluidized bed. Trudy Ural.politekh. inst. no.98:67-71 '60. (MIRA 14:3)

(Nonferrous metals—Metallurgy) (Slag) (Fluidization)

SYAO CHZHI-TSAYN; SMIRNOV, V.I.

Studying the sulfatization roasting in a fluidized bed of converter slags from the nickel industry. Izv.vys.ucheb.zav.; tsvet.met. 3 no.2:80-87 '60. (MIRA 15:4)

1. Ural'skiy politekhnicheskiy institut, kafedra metallurgii tyazhelykh tsvetnykh metallov.
(Ore dressing) (Fluidization)

FOKIN, V.V.; MISHIN, V.D.; SMIRNOV, V.I.

Studying the behavior of nonferrous and rare metals during the treatment of furnace dusts by the Waelz process. Trudy Alt.GMNII AN Kazakh.SSR 11:21-25 '61. (MIRA 14:8)
(Nonferrous metals--Metallurgy) (Fly ash)

FOKIN, V.V.; SMIRNOV, V.I.

Kinetics of zinc volatilization from metallurgical dusts during their treatment by the Waelz process. Izv. vys. ucheb. zav.; tsvet. met. 4 no.4:57-62 '61. (MIRA 14:8)

1. Ural'skiy politekhnicheskiy institut, kafedra metallurgii tyazhelykh tzvetnykh metallov.
(Zinc—Metallurgy) (Fly ash)

LEBED', B.V.; SMIRNOV, V.I.

Copper removal from slags from reverberatory furnace smelting.
Izv. vys. ucheb. zav.; tsvet. met. 4 no.6:43-47 '61.
(MIRA 14:12)

1. Ural'skiy politekhnicheskiy institut, kafedra metallurgii tyazhelykh tsvetnykh metallov.
(Slag)
(Copper)

SMIRNOV, V.I.

All-Union Conference on Copper Refining. Izv. vys. ucheb. zav.; tsvet. met. 4 no.6:121-122 '61. (MIRA 14:12)
(Copper industry--Congresses)

SYAO CHZHI-TSAYN; SMIRNOV, V.I.

Investigating the sulfatizing roasting in a fluidized bed of cobalt-bearing mattes from nickel and copper plants. TSvet. met. 34 no.1:35-39 Ja '61. (MIRA 17:3)

1. Ural'skiy politekhnicheskiy institut.

SMIRNOV, V.I.; prof.; ZAPLAVNYY, A. Ya., dotsent kand.ekonomicheskikh nauk

"Economic aspects of nonferrous metallurgy" by S.A. Pevuchin and others. Reviewed by V.I. Smirnov, A.IA. Zaplavnyi. TSvet. met. 34 no.6:86-88 Je '61. (MIRA 14:6)

1. Deystvitel'nyy chlen AN KazSSR.
(Nonferrous metals--Metallurgy) (Pervushin, S.A.)
(Rachkovskiy, S.Ya.) (Gol'braykh, S.Ya.)
(Malinova, R.D.)
(Bykova, T.D.)

SMIRNOV, V.I.; LEBED', B.V.; TIKHONOV, A.I.; YABLONSKIY, Yu.A.

Complex processing of waste slags from the copper industry. (MIRA 14:10)
TSvet.met. 34 no.10:46-50 O '61.
(Copper industry--By-products) (Slag)

S/080/61/034/012/001/017
D202/D305

AUTHORS: Deyev, V.I., and Smirnov, V.I.

TITLE: The mechanism of oxidation of rhenium sulfide (IV)

PERIODICAL: Zhurnal prikladnoy khimii, v. 34, no. 12, 1961, 2594 - 2601

TEXT: The above study was carried out on 500 mg samples, with grain size of 0.074 mm, compacted and heated in a stream of pure, dry air (5 l/hour) either continuously in the temperature range 20 - 550°C or at definite temperatures of 225, 290, 340, 450 and 550°C. The oxidation was followed by the weight gain method and by microscopic examination of the solid oxidation products. It was found that ReS_2 reacts not only with oxygen but with rhenium trioxide and septoxide as well. The latter reactions were investigated separately in sealed tubes, in an atm. of N_2, the amounts of reacting materials being chosen in such a way that the developing partial SO_2 pressure did not exceed 1 atm. Calculated equilibrium

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S/080/61/034/012/002/017
D202/D305

The mechanism of oxidation of ...

constants, based on data from Soviet and Western literature, proves that under these conditions the oxidation reaction is an irreversible one. Values of the calculated isothermal isobaric potential ΔZ^0 and the equilibrium constant K_p for 6 possible $ReS_2 - O_2$ reactions and 2 rhenium oxide reduction with SO_2 reactions are given in a table. The effects of temperature and of the time of heating on the sulfide oxidation have proved that the process begins at 160 °C but is very slow until 225°C reaching about 5 % after heating for 1 hour. In the range of 290 - 450°C the rate rises markedly and at 450°C the reaction is practically finished after heating for 40 min., a further temperature rise having only a limited effect. The main oxidation products of ReS_2 are: Re_2O_7, ReO_3, ReO_2 and SO_2. The authors thoroughly determined the amounts of the different oxides formed: Re_2O_7 - by the loss in weight of the sample plus the amount of Re dissolved in water and ReO_2 - by treating the water extracted sample with conc. HCl. The remaining undissolved ReO_3 and ReS_2 by oxidation with aqueous alkaline H_2O_2. At 290°C the oxida-

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S/080/61/034/012/001/017
D202/D305

The mechanism of oxidation of ...

tion products consist mostly of Re_2O_7 with little ReO_3 and traces of ReO_2, the amount of the septoxide being about 40 % after one hour. At 340°C the amount of Re_2O_7 rises to 60 % that of ReO_3 to 20 % and that of ReO_2 remains almost unchanged. At 450° and 550°C during the first 15 min. heating the formation of ReO_2 is increased, falling practically to zero after 60 and 30 min. respectively, owing to its oxidation to the volatile Re_2O_7. The author studied the formation of the above oxides in relation to temperature and also microscopically on polished sections of the oxidized samples. These observations proved that at temperatures 180-220°C the oxidation of ReS_2 takes place not on the surface, but throughout the whole thickness, the oxidation product being Re_2O_7. At 225°C three oxidation zones were observed: an innermost consisting of ReS_2 and ReO_3 and intermediate one formed by loose ReO_3 and an outer layer consisting of ReO_2 formed in the author's opinion, from ReO_3 reduced by SO_2. At 290° and 340°C a ReO_2 layer appeared between the

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The mechanism of oxidation of ...

ReS_2 and ReO_3 zones, the dioxide being formed by the reaction of the sulfide and the trioxide; no outer ReO_2 layer was observed. At 450°C only two zones are found: an inner ReS_2 and an outer ReO_2 layer. At this temperature the dependence of the degree of oxidation on time of heating is linear. The effect of the structure of different oxides on the diffusion rate of gaseous reaction products is discussed. The authors also studied the following reactions of rhenium sulphide with different oxides on specially selected mixtures:

$$ReS_2 + 7Re_2O_7 = 15ReO_3 + 3SO_2 \quad I$$

$$ReS_2 + 2Re_2O_7 = 5ReO_2 + 2SO_2 \quad II$$

$$ReS_2 + 6ReO_3 = 7ReO_2 + 2SO_2 \quad III$$

The effects of temperature and time of heating on these reactions are given. Up to 400°C the reaction between ReS_2 and Re_2O_7 begins with the formation of the trioxide (reaction I) and proceeds above 450°C with the formation of the dioxide (reactions II and III). It

The mechanism of oxidation of ...

is concluded that the first oxidation product of ReS_2 up to 210°C is Re_2O_7 which above that temperature begins to react with the sulphide, forming ReO_3; this reaction is pronounced above 300°C. There are 5 figures, 1 table and 12 references: 11 Soviet-bloc and 1 non-Soviet-bloc. The reference to the English-language publication reads as follows: O. Kubashevskiy, E. Evans, 'Metallurgical Thermochemistry', London (1958).

SUBMITTED: March 6, 1961

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B106/B110

15.2610

AUTHORS: Deyev, V. I., and Smirnov, V. I., Academician of the Academy of Sciences Kazakhskaya SSR

TITLE: Saturation vapor pressures of rhenium disulfide, dioxide, and trioxide

PERIODICAL: Akademiya nauk SSSR. Doklady, v. 140, no. 4, 1961, 822-824

TEXT: For enrichment and separation of rhenium in the pyrometallurgical processing of sulfidic materials, their physicochemical properties must be known. The vapor pressures of ReS_2, ReO_2, and ReO_3 have so far only been studied by the flow method (Ref. 4: R. A. Isakova, V. D. Ponomarev, Izv. AN KazSSR, ser. metallurgii, obogashcheniya i ogneuporov (Series of metallurgy, enrichment and refractory materials), v. 3, 10 (1960); Ref. 6: Rukovodstvo po preparativnoy neorganicheskoy khimii, pod red. G. Brauer (Guide to preparative inorganic chemistry, edited by G. Brauer), IL, 1956). The authors of the present paper determined the saturation vapor pressures of these three rhenium compounds by the effusion method. The initial substances were prepared by a known method (Ref. 6). ReS_2 samples

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Saturation vapor pressures ...

contained 73.88% of rhenium and 25.20% of sulfur. rhenium dioxide samples 85.06% Re, and rhenium trioxide samples 79.54% Re. The samples were reduced to a grain size <0.1 mm. Measurements were carried out in high vacuum (10^{-5}-10^{-6} mm Hg). A small quartz ampul was used as effusion vessel; the area of the effusion hole was measured with a metallographic microscope. The equilibrium vapor pressures were calculated from Knudsen's equation which was given the following form:

$$\log P = \log \Delta q + 1/2 \log T - 1/2 M - \log a - \log \tau + 4.4558 \quad (1)$$

(P - vapor pressure in mm Hg; Δq - weight of evaporated substance in mg; T - absolute temperature; a - area of the effusion hole in cm^2; τ - time of experiment in min; M - molecular weight of substance in vapors). Temperature fluctuations during the experiment did not exceed $\pm 3^0$. The vapor pressure of rhenium disulfide was determined in a temperature range of 505-700°C. The equation $\log P = -(4976/T) + 3.214$ (2) (P in mm Hg) was obtained for its temperature dependence. The value 22.66 kcal/mole results for the sublimation enthalpy. These results are in agreement with published data in Ref. 4. (R. A. Isakova, V. D. Ponomarev, Izv. AN. KazSSR, ser. metallurgii, obogashcheniya, ogneuporov, v. 3, 10 (1960)). The values obtained by the authors for the saturation vapor pressures of ReO_2 and ReO_3, on the other hand, strongly deviate from

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Saturation vapor pressures ...

published data obtained by the flow method. The maximum relative error of the effusion method is 5-6%, whereas in the flow method additional errors are possible in the case of ReO_2 and ReO_3 which are readily oxidizable on heating. These errors are due to insufficient purification of commercial nitrogen from oxygen and water vapor. The saturation vapor pressure of ReO_2 was studied in the temperature range of 650-785°C. Above 785°C, rhenium dioxide disproportionated. The temperature dependence of the saturation vapor pressure of ReO_2 follows the equation $\log P = -(14347/T) + 11.65$ (3) (P in mm Hg). $\Delta H_T^\circ = 65.64$ kcal/mole is obtained for the sublimation enthalpy. For rhenium trioxide, log P and the temperature in the range of 325-420°C are interrelated according to equation $\log P = -(10882/T) + 15.16$ (4). Thus, we obtain: $\Delta H_T^\circ = 49.78$ kcal/mole. According to Eqs. (3) and (4), the saturation vapor pressures of ReO_2 and ReO_3 reach the value of 760 mm Hg at 1363°C and 614°C, respectively. Rhenium trioxide passes over to the gaseous phase in oxidative roasting of sulfidic concentrates. There are 3 figures and 9 Soviet references.

Card 3/4

ABDEYEV, Masgut Abdrakhmanovich; SMIRNOV, V.I., akademik, otv. red.; KUBYSHEV, N.N., retsenzent; KHAN, O.A., retsenzent; KHUDYAKOV, A.G., tekhn. red.

[Complex metal ore mattes and their conversion] Polimetallicheskie shteiny i ikh konvertirovanie. Alma-Ata, Izd-vo Akad. nauk Kazakhskoi SSR, 1962. 227 p. (MIRA 16:1)

1. Akademiya nauk Kazakhskoy SSR (for Smirnov).
(Nonferrous metals--Metallurgy)

S/149/62/000/003/001/011
A006/A101

AUTHORS: Tishchenko, A. A., Smirnov, V. I.

TITLE: Conditions of sodium selenite and selenate formation during sintering of silver selenide with soda ash

PERIODICAL: Izvestiya vysshikh uchebnykh zavedeniy, Tsvetnaya metallurgiya, no. 3, 1962, 49 - 52

TEXT: There are not literature data available on theoretically founded conditions of sintering copper-electrolyte slurries with soda-ash in oxidizing atmosphere, concerning temperature and soda consumption. Since silver selenide is the basic selenium-containing component of the slurry, special investigations were made to reveal conditions of sodium selenite and selenate formation in sintering roasting of synthetic selenide, depending on temperature and soda consumption. The initial material for silver selenide synthesis was chemically pure silver nitrate and grade [illegible] 37-46 (TsMTU 37-46) selenium with 99.37% Se. Selenium oxidation to selenite and selenate was studied at temperatures from 300 - 850°C, and selenium oxidation at various Na_2CO_3 : Ag_2Se ratios was determined.

Card 1/2

S/137/62/000/004/028/201
A006/A101

AUTHORS: Smirnov, V. I., Rybnikov, V. I.

TITLE: On the problem of the complex processing of oxidized nickel-cobalt ores from Central Kazakhstan

PERIODICAL: Referativnyy zhurnal, Metallurgiya, no. 4, 1962, 27, abstract 4G166 ("Metallurg. i khim. prom-st' Kazakhstana. Nauchno-tekhn. sb.", 1961, no. 3(13) 28-30)

TEXT: In a 2-liter laboratory autoclave the leaching out with H_2SO_4 of two oxidized Ni-Co-ore samples was investigated. Optimum results were obtained at 240°C; the ratio of H_2SO_4 weight to the ore weight in the pulp was 0.25; Ni was extracted up to 98.5%; that of Co to 95%; H_2SO_4 consumption was 16-21% of the ore weight. The lixivation residue was melted in an electric furnace to Fe-alloy with 85% Fe extraction.

A. Tseydler

[Abstracter's note: Complete translation]

Card 1/1

S/149/61/000/003/001/004
A006/A106

AUTHORS: Deyev, V. I., Smirnov, V. I.

TITLE: Oxidation kinetics of rhenium, molybdenum and indium sulfides in a fluidized bed

PERIODICAL: Izvestiya vysshikh uchebnykh zavedeniy, Tsvetnaya metallurgiya, no. 3 1961, 44 - 49

TEXT: Fluid-bed roasting of sulfide concentrates has lately come into extended use. The behavior of rare elements during roasting is mainly determined by the physical and chemical properties of their compounds, the oxidation rate of sulfides and the conditions under which the process is conducted. To complete literature data on this subject (Ref 1 - 4: V. D. Budon. Izv. AN KazSSR, seriya metallurgii, obogashcheniya i ogneuporov, no. 1, 1958; A. N. Zelikman, L. V. Belyayevskaya ZhNKh, vol. 1, no. 10, 1956; V. I. Bibikova, I. I. Vasilevskaya, Sb. nauchnykh trudov Giredmeta, no. 1, 1959; M. F. Stubs, J. Amer. Chem. Soc., 74, no. 4, 1952) the authors present results on oxidation kinetics of rhenium, molybdenum and indium sulfides in a fluidized bed depending on temperature, duration of roasting and oxygen concentration in the gaseous phase. The investigation was made with synthetic ReS_2, MoS_2 and In_2S_3 (composition given in table) and

Card 1/5

S/149/61/000/003/001/004
A006/A106

Oxidation kinetics of rhenium, molybdenum ...

with the aid of a 20 mm - diameter quartz tube with a cone. A 12 mm-diameter porelain grid is mounted in the lower section of the cone through which the blast is supplied to the fluid-bed at a rate of 500 cm^3/min. Sulfides of low porosity and - 0.15 + 0.20 mm size, produced from briquets pressed in a steel press mold, were used. To separate the sulfide grains and to maintain a constant temperature in the fluid bed, 4.5 g of a diluent were charged into the tube, the blast being supplied simultaneously (air or a nitrogen-oxygen mixture). Oxygen concentration in the gas mixture was 2.5; 10.0; 20.8 and 30.0%. The sulfide batch was placed into the tube when the rated temperature had been attained and thus was immediately in the high-temperature range. The temperature was controlled by a chromel-alumel thermocouple. Gaseous reaction products were back-titrated by iodine and alkaline solutions. The temperature dependence of the oxidation rate of the sulfides in a fluid-bed was studied at 250 - 600°C for rhenium sulfide; at 300 - 650°C for molybdenum sulfide and 335 - 750°C for indium sulfide. A beginning "visible" oxidation was observed at 150°C for rhenium sulfide, at 230 - 240°C for molybdenum sulfide and at 220°C for indium sulfide. A sharp increase in the rate and degree of oxidation was observed at 300 - 420, 300 - 400 and up to 520°C, respectively. Curves plotted show an accelerated reaction in the initial stage. A maximum on the oxidation rate curve for indium sulfide is most pronounced at low temperatures. The oxidation rates of rhenium and molybdenum sulfides show a well marked maximum

Card 2/5

Oxidation kinetics of rhenium, molybdenum ...

gree of oxidation is also raised. The dependence of the oxidation rate of the sulfides on oxygen concentration in the gaseous phase was studied at temperatures of oxidation in the diffusion and intermediate range. In the diffusion range the oxidation rate increases linearly with a higher oxygen content. In the intermediate range the effect of oxygen concentration on the process rate is less marked and the order of reaction in respect to oxygen varies from one to zero with a higher oxygen concentration. The inflammation temperature of the sulfides in a fluid-bed were calculated on the basis of the oxidation rate and are 340 - 360°C for ReS_2; 360 - 380° C for MoS_2 and 450 - 460°C for In_2S_3. There are 7 figures and 13 references: 11 Soviet-block and 2 non-Soviet-block.

ASSOCIATION: Ural'skiy politekhnicheskiy institut (Ural Polytechnic Institute) Kafedra metallurgii tyazhelykh tsvetnykh metallov (Department of Metallurgy of Heavy Non Ferrous Metals)

SUBMITTED: July 25, 1960.

RYBNIKOV, V.I.; SMIRNOV, V.I.

Investigating the process of obtaining a nickel-cobalt sulfide concentrate out of solutions for the leaching of oxidized ores. Izv. vys. ucheb. zav.; tsvet. met. 5 no.5:79-85 '62. (MIRA 15:10)

1. Ural'skiy politekhnicheskiy institut, kafedra metallurgii tyazhelykh tsvetnykh metallov.
(Nonferrous metals—Metallurgy) (Hydrometallurgy)

ZHILKIN, V.B.; Prinimali uchastiye: ITEL'SON, G.M.; KALGANOV, D.K.; KADOBNOV, V.D.; OLEYNIKOV, I.S.; SMIRNOV, V.I.; BLYUMENFEL'D, M.K.; KONYASHIN, Ye.I.; LASKIN, R.L.

Experimental use of titanium in hydrometallurgy. Titan i ego splavy no.8:273-278 '62. (MIRA 16:1)
(Hydrometallurgy--Equipment and supplies)
(Titanium--Corrosion)

S/032/62/028/002/031/037
B124/B101

AUTHORS: Fokin, V. V., and Smirnov, V. I.

TITLE: Laboratory device for automatic gravimetric checking of thermal processes

PERIODICAL: Zavodskaya laboratoriya, v. 28, no. 2, 1962, 240-242

TEXT: A hermetically sealed device consisting of an analytical balance and an annular torsion indicator placed under a bell jar has been developed by the authors. A suspension device bearing a crucible in the body of a furnace has been substituted for the left-hand balance pan. The suspension device is heat-insulated by a mica screen; the water-cooled platform of the balance is about 800 mm away from the crucible. The torsion balance indicator made of phosphor-bronze tape bears two small mirrors at the top. A vertical deformation of the ring of 1.0 to 2.0 mm leads to a deflection of the mirrors and, thus, to a displacement of the light spot equal to 100 - 200 mm. Weights ranging from 1 mg to some tenths of a gram are recorded by the plateholder of an oscilloscope with a slit height of 120 mm. The plateholder is filled with photographic-

Laboratory device for automatic ...

paper tape. A Warren-type synchronous motor with a decelerator controls the rotary speed of the drum. The error in temperature control is 0.5% between 0 and 1500°C. Fig. 2 shows the curves for weight changes of pure oxides of non-ferrous and rare-earth metals with a uniform temperature increase from 20 to 1150°C and successive isothermal treatment. There are 2 figures, 1 table, and 4 Soviet references.

ASSOCIATION: Ural'skiy politekhnicheskiy institut im. S. M. Kirova (Ural Polytechnic Institute imeni S. M. Kirov)

Fig. 1. Schematic diagram of the automatic control unit for changes in weight: (1) decelerator; (2) plateholder; (3) vertical plateholder-adjusting screw; (4) light-tight hood; (5) glass bell; (6) platform; (7) illuminator; (8) balance; (9) annular indicator.
Fig. 2. Change in weight of a number of metal oxides at atmospheric pressure (a) and at 1 mm Hg (б). Legend: (1) mg; (2) min.

SMIRNOV, V.I.; YABLONSKIY, Yu.A.; TIKHONOV, A.I.; LEBED', B.V.

Flow-sheets for the complete retreatment of slags from plants of nonferrous metallurgy. TSvet. met. 35 no.9:50-56 S '62. (MIRA 16:1)

(Nonferrous metal industries--By-products)
(Slag)

S/020/62/145/004/023/024
B101/B138

AUTHORS: Tishchenko, A. A., and Smirnov, V. I., Academician AS KazSSR

TITLE: Thermodynamics, and an experimental study, of the formation of sodium selenite and selenate during the sintering of copper selenide with soda ash

PERIODICAL: Akademiya nauk SSSR. Doklady, v. 145, no. 4, 1962, 863-866

TEXT: The aim of the work was to find the conditions for sintering the sludge formed in the production of electrolytic copper with soda, under which the oxidation of the selenium produced would not exceed Se^{4+}. The calculation of the isobaric potential and equilibrium constant for the reactions $Cu_2Se + Na_2CO_3 + 2O_2 = 2CuO + Na_2SeO_3 + CO_2$ (I); $2CuSe + 2Na_2CO_3 + 5O_2 = 4CuO + 2Na_2SeO_4 + 2CO_2$ (II); $2CuSe + 2Na_2CO_3 + 3O_2 = 2CuO + 2Na_2SeO_3 + 2CO_2$ (III); $CuSe + Na_2CO_3 + 2O_2 = CuO + Na_2SeO_4 + CO_2$ (IV); $Ag_2Se + Na_2CO_3 + O_2 = 2Ag + Na_2SeO_3 + CO_2$ (V);

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LEBED', B.V.; SMIRNOV, V.I., akademik

Thermodynamics and kinetics of the interaction of magnetite with iron, zinc, and copper sulfides in slag melts.
Dokl. AN SSSR 146 no.4:864-867 O '62. (MIRA 15:11)

1. Ural'skiy politekhnicheskiy institut im. S.M. Kirova.
2. AN KazSSR (for Smirnov).
(Magnetite)
(Sulfides--Metallurgy)

LEBED', B.V.; SMIRNOV, V.I., akademik

Experimental determination of the activity of zinc oxide in synthetic slags. Dokl. AN SSSR 147 no.1:159-161 N '62. (MIRA 15:11)

1. Ural'skiy politekhnicheskiy institut im. S.M. Kirova.
2. AN Kazakhskoy SSR (for Smirnov).
(Zinc oxide) (Metallic oxides)

SMIRNOV, V. I. (Ural polytechnical Institute S. M. Kirov)

"Present state of metallurgy of heavy nonferrous metals". Expounds the possibility of pyrometallurgical redistributions by nonferrous metallurgy factories and noted that in practice of flame refining also are attained significant successes, because of further intensification of processes of smelting, application of improved systems of processing of raw material and modernization and replacement of obsolete equipment.

Report presented at the Intervuz Conference on Electrodeposition of Nonferrous Metals, Ural Polytechnical Institute im S. M. Kirov, Sverdlovsk, held from 27-30 May, 1963.

(Reported in Tsvetnyye Metally, No. 10, 1963, pp. 82-84)

JPRS 24,651 19 May 1964

SMIRNOV, V.I.; YABLONSKIY, Yu.A.; EL'KIND, L.M., red.izd-va; GINZBURG, R.Ya., tekhn. red.

[Technical progress is the basis for an expansion of nonferrous metallurgy] Tekhnicheskii progress - osnova razvitiia tsvetnoi metallurgii. Moskva, Metallurgizdat, 1963. 42 p. (MIRA 17:1)

TATARINOV, Pavel Mikhaylovich; SMIRNOV, V.I., retsenzent;
KOLOSHINA, T.V., red. izd-va; GUROVA, O.A., tekhn. red.

[Conditions governing the formation of metal ore and nonmetallic mineral deposits] Usloviia obrazovaniia mestorozhdenii rudnykh i nerudnykh poleznykh iskopaemykh. Izd.2., ispr. i dop. Moskva, Gosgeoltekhizdat, 1963. 369 p. (MIRA 17:2)

BAYMAKOV, Yuriy Vladimirovich; ZHURIN, Aleksandr Ivanovich; LEVIN, A.I., prof., doktor tekhn. nauk, retsenzent; SMIRNOV, V.I., prof., retsenzent; STENDER, V.V., prof., retsenzent; GORBUNOVA, K.M., prof., doktor khim. nauk, red.; PAKHOMOVA, G.N., kand. tekhn. nauk, red.; MARENKOV, Ye.A., red.; MISHARINA, K.D., red.izd-va; MIKHAYLOVA, V.V., tekhn. red.

[Electrolysis in hydrometallurgy]Elektroliz v gidrometallurgii. Moskva, Metallurgizdat, 1963. 616 p. (MIRA 16:2)

1. Kafedra tekhnologii elektrokhimicheskikh proizvodstv Ural'skogo politekhnicheskogo instituta (for Levin). 2. Kafedra metallurgii tsvetnykh metallov Ural'skogo politekhnicheskogo instituta, Deystvitel'nyy chlen Akademii nauk Kazakhskoy SSR (for Smirnov). 3. Chlen-korrespondent Akademii nauk Kazakhskoy SSR (for Stender).
(Hydrometallurgy) (Electrometallurgy)

SMIRNOV, Vasiliy Ivanovich; KHUDYAKOV, Ivan Fedorovich; TIKHONOV, Anatoliy Ivanovich; KIL'DIBEKOV, R.G., retsenzent; MISHIN, V.D., red.; KRYZHOVA, M.L., red. izd-va; MATLYUK, R.M., tekhn. red.

[Obtaining cobalt from converter slags] Izvlecheniye kobal'ta iz konverternykh shlakov. Sverdlovsk, Metallurgizdat, 1963. 150 p. (MIRA 16:5)

(Cobalt) (Slag)

SMIRNOV, V.I.; DOROSHKEVICH, A.P.; YABLONSKIY, Yu.A.

Effect of the degree of roasting copper-zinc concentrates on the results of smelting residues. Izv. vys. ucheb. zav.; tsvet. met. 6 no.4:71-75 '63. (MIRA 16:8)

1. Ural'skiy politekhnicheskiy institut, kafedra metallurgii tyazhelykh tsvetnykh metallov.
(Nonferrous metals--Metallurgy)
(Tailings (Metallurgy))

YEMEL'YANOV, B.V.; SMIRNOV, V.I.; TSYPKINA, L.M.

Analysis of the system NaCl - KCl - Na_2CO_3 - H_2O according to two properties. Zav. lab. 29 no.10:1174-1175 '63.
(MIRA 16:12)

LEONOV, L.M.; SAVIN, I.V.; LUTOKHIN, D.I.; SMIRNOV, V.I.

Smelting raw charges with a high zinc content. TSvet. met. 36 no.1:16-21 Ja '63. (MIRA 16:5)
(Copper—Metallurgy) (Zinc)

SMIRNOV, V.I.

Present state of metallurgy of heavy nonferrous metals. TSvet. met. 36 no.6:43-50 Je '63. (MIRA 16:7)

(Nonferrous metals--Metallurgy)

ILCHEV, S.L.; SMIRNOV, V.I.; MISHIN, V.D.

Technical progress in plants of nonferrous metallurgy in the People's Republic of Bulgaria. TSvet. met. 36 no.8:92-94 Ag '63. (MIRA 16:9)

(Bulgaria--Nonferrous metal industries)

BABENKO, A.R.; SMIRNOV, V.I.

Determining the ignition temperature of sulfides in a fluidized bed. Sbor. nauch. trud. Ural. politekh. inst. no.134:9-13 '63. (MIRA 17:1)

RYBNIKOV, V.I.; SMIRNOV, V.I.

Experimental autoclave leaching of oxidized nickel-cobalt ores. Sbor. nauch. trud. Ural. politekh. inst. no.134:40-45 '63. (MIRA 17:1)

YABLONSKIY, Yu.A.; SMIRNOV, V.I.; KLYUYEVA, A.V.; RYZH, Ye.I.; BUROV, G.D.

Cobalt precipitation from lean solutions by sodium sulfide. Sbor. nauch. trud. Ural. politekh. inst. no.134:46-53 '63. (MIRA 17:1)

FOKIN, V.V.; SMIRNOV, V.I.

Kinetic characteristics of the sublimation of zinc and cadmium from charges containing a series of volatile metal compounds. Sbor. nauch. trud. Ural. politekh. inst. no.134:65-70 '63. (MIRA 17:1)

KHUDYAKOV, I.F.; [illegible]LYUYEVA, A.V.; SMIRNOV, V.I., akademik

Conditions of the oxidation of ferrous sulfate and of the hydrolysis of the oxidation products in autoclave processes. Dokl. AN SSSR 148 no.3:654-657 Ja '63. (MIRA 16:2)

1. Ural'skiy politekhnicheskiy institut im. S.M. Kirova.
2. AN KazSSR (for Smirnov).
(Iron sulfates) (Oxidation) (Hydrolysis)

YAROSLAVTSEV, A.S.; SHURYGIN, P.M.; SMIRNOV, V.I., akademik

Thermodynamic analysis of reactions involved in the autoclave leaching of sulfides. Dokl. AN SSSR 153 no.2:408-411 N '63. (MIRA 16:12)

1. Ural'skiy politekhnicheskiy institut im. S.M.Kirova. 2. AN KazSSR (for Smirnov).

SMIRNOV, Vasiliy Ivanovich; TSEYDLER, Aleksandr Al'bertovich; KHUDYAKOV, Ivan Fedorovich; TIKHONOV, Anatoliy Ivanovich

[Metallurgy of copper, nickel and cobalt; alternative course] Metallurgiia medi, nikelia i kobal'ta; alternativnyi kurs. [By] V.I.Smirnov i dr. Moskva, Izd-vo Metallurgiia. Pt.1. [Metallurgy of copper] Metallurgiia medi. 1964. 462 p. (MIRA 17:8)

ACCESSION NR: AP4021561 S/0136/64/000/003/0063/0066

AUTHORS: Deyev, V. I.; Smirnov, V. I.

TITLE: The behavior of rhenium during oxidizing roasting of molybdenum concentrates

SOURCE: Tsvetny*ye metally*, no. 3, 1964, 63-66

TOPIC TAGS: rhenium, rhenium trioxide, rhenium heptoxide, oxidation, vapor pressure, sulfide, reaction rate, sulfur dioxide, sublimation

ABSTRACT: Although a number of papers are devoted to oxidizing roasting many questions remain to be clarified. V. M. Petrov (Author's abstract of a dissertation published by the Krasnoyarsk Institute of Nonferrous Metallurgy, 1961), for example, attributes the incomplete rhenium sublimation to the possible reaction of Re_2O_7 with MoS_2 and ReS_2 with MoO_3 which is accompanied by the formation of lower Rh oxides. The authors found that the oxidation of rhenium sulfide occurs according to the reaction

$$2ReS_2 + 7.5O_2 = Re_2O_7 + 4SO_2$$

Card 1/3

ACCESSION NR: AP4021561

In the initial stage of the reaction, part of the rhenium heptoxide evolves with the gas while another part reacts with MoS_2 and FeS. Rhenium tri- and dioxide are formed. The experimental part was carried out as follows: At temperatures above 1160C the authors succeeded in sublimating ReO_2. Synthetic rhenium oxides and sulfides were used for the investigation of the reaction rate with MoS_2, FeS and MoO_2 in a purified nitrogen flow at a rate of 3 l/hr as well as in sealed pyrex capsules. The reaction rate was determined by the amount of sulfur in the gaseous phase and in the solid residue. Above 340C, the Re_2O_7 - MoS_2 reaction was quite vigorous and at 550C the rhenium heptoxide reaction with Mo disulfide reached 90% within 30 minutes. The red color of the condensed products of reaction shows the formation of rhenium trioxide. The reaction of Re_2O_7 with sulfur dioxide was investigated under analogous conditions. 0.250 g of Re_2O_7 and SO_2 were placed into a 40 cm^3 capsule at 760 mm Hg. which corresponds to 0.105 g sulfur dioxide. The specimens were cooled with a jet of cold air. The degree of reduction of the heptoxide amounted to a mere 7% after 60 min at 550C.

Card 2/4

ACCESSION NR: AP4021561

Reaction of ReO_3 with MoS_2 sets in at 280-290C and that of ReO_3 with FeS at 445-450C. X-ray investigation revealed the formation of ReO_2 in the products of reaction. Above 450C and 500C respectively an appreciable acceleration of the reaction was observed reaching a maximum at 450C for MoS_2 and 560C for FeS. A further increase did not affect MoS_2. However, in view of the surface formation of iron sulfate which prevents the diffusion of ReO_3 at lower temperatures, another peak is reached above 600C in the reaction of ReO_3 to FeS, when the sulfate is destroyed. ReS_2 begins to react with MoO_3 at 300C reaching a peak at 650C so that the reaction is completed by 77% within 50 minutes. By using the excess of MoO_3 the reaction at 650 and 700C is made more complete. The authors recommend a more thorough roasting of the sinter in order to improve sublimation of Rh, working conditions which would impede the reaction of the sintering products with the initial sulfides and a supply of excess air. Sintering in an effervescing layer also enhances Rh sublimation. A further improvement over other methods was found by smelting Rh-containing copper concentrates in suspension. Orig. art. has: 9 formulae.

ASSOCIATION: None

Card 3/4

SMIRNOV, Vladimir Ivanovich

[Problems of endogenic metallogeny] Problemy endogennoi metallogenii, Moskva, Nauka, 1965. 17 p. (Chteniia im. V.I. Vernadskogo, no.6) (MIRA 18:8)

[illegible], L.S.; CHERNYSHEV, G.K., SMIRNOV, V.I.

Thermodynamic analysis of processes of the autoclave reduction of metals from solutions. Izv. vys. ucheb. zav.; tsvet. met. 8 no.4:48-53 '65. (MIRA 18:9)

1. Kafedra metallurgii tyazhelykh tsvetnykh metallov Ural'skogo politekhnicheskogo instituta.

ACC NR: AP7001522 (A) SOURCE CODE: UR/3117/65/000/006/0070/0087

AUTHORS: Zimin, N. V. (Engineer); Kushch, E. V. (Engineer); Sergeyeva, K. I. (Engineer); Smirnov, V. I. (Engineer)

ORG: none

TITLE: Development of the heat treatment process for the planet pinions of tractor K-700

SOURCE: Leningrad. Nauchno-issledovatel'skiy institut tokov vysokoy chastoty. Trudy, no. 6, 1965. Promyshlennoye primeneniye tokov vysokoy chastoty (Industrial application of high-frequency current), 70-87

TOPIC TAGS: metal heat treatment, transmission gear ~~manufacture~~, tractor / K-700 tractor

ABSTRACT: In view of the mass production of tractor K-700, a practical and efficient method of heat treating the planet pinions was developed. The heating and cooling method for the production heat treatment is described (see Fig. 1), and the effects of changed heater geometry and cooling spray parameters on the hardened zone geometry are discussed. Curves of the cooling rates as a function of temperature and of cooling time are presented for the hardened regions. The hardness profiles are also included. A table of the production heat treatment parameters is given, and the experimental results on the dimensional effects of the heat treatment process are presented and discussed. In 1964 21 000 gears were successfully heat-treated by this method. It is suggested that this method can be applied to other types of gears.

Card 1/2

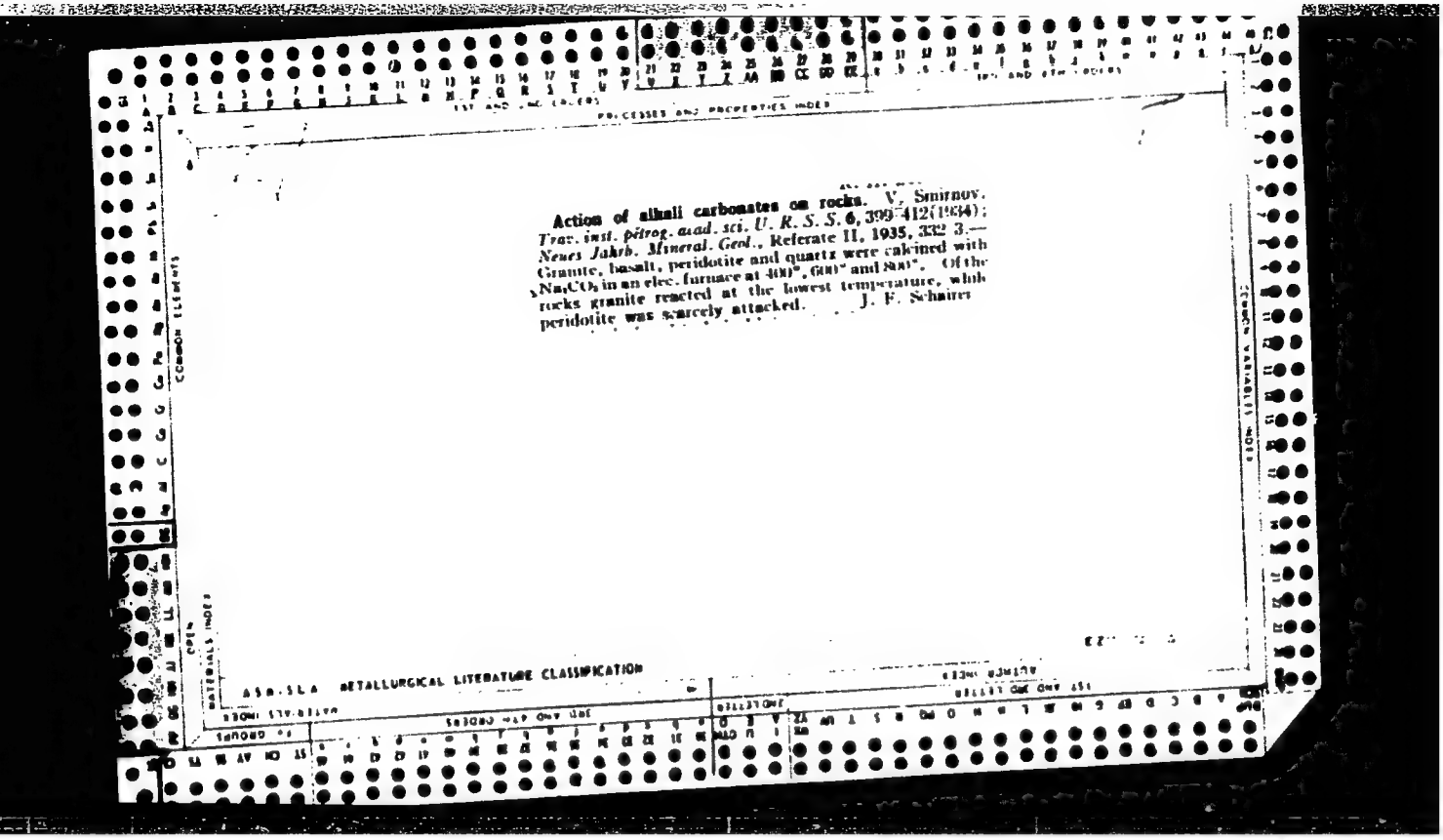
Card 2/2

SMIRNOV, V. I.

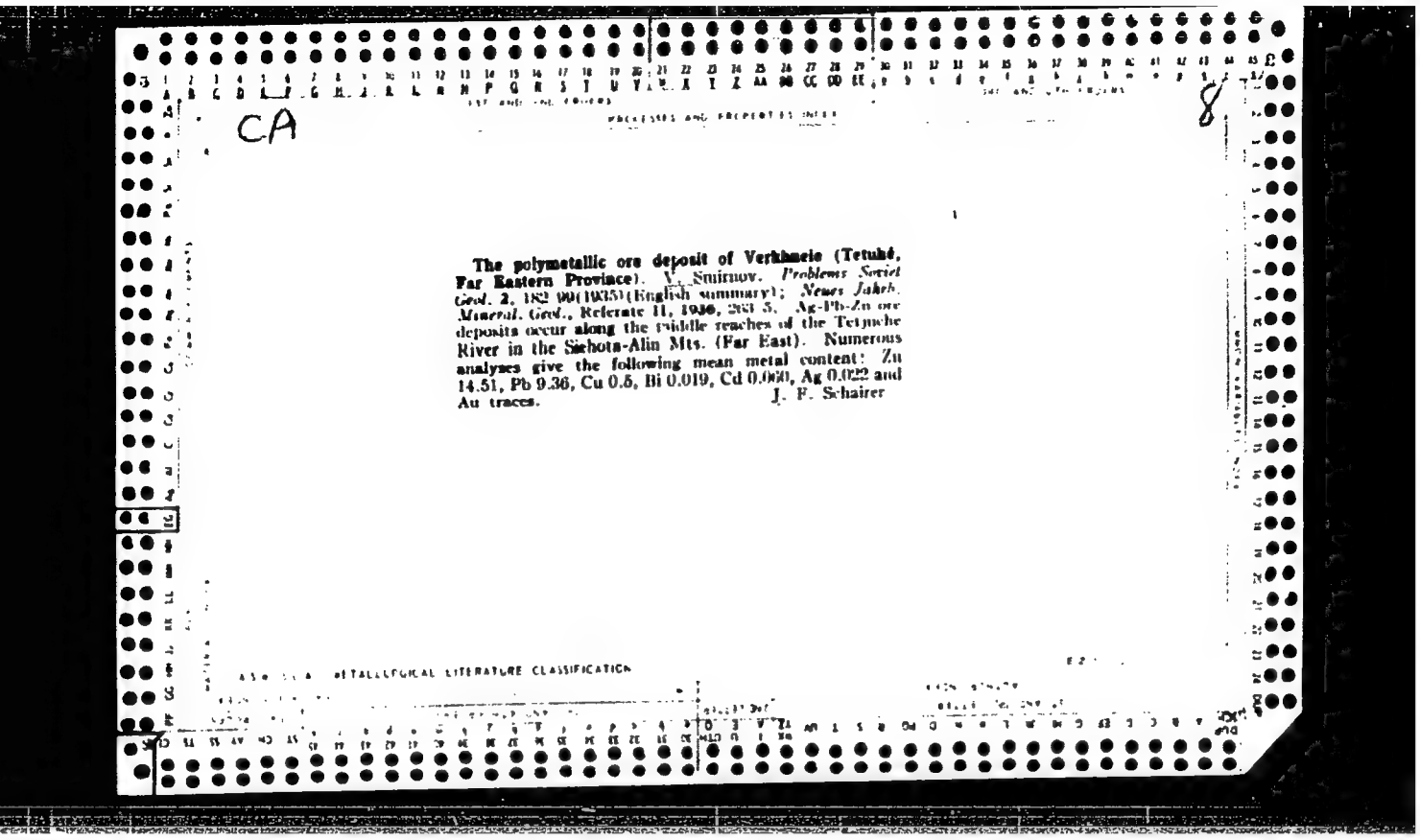
RUSSIA (1923 - U.S.S.R.)

Instructions for applying resource classification to mercury and antimony deposits

1. Mercury.
2. Antimony.
3. Mines and mineral resources- Russia I. Smirnov, V.I.



Action of alkali carbonates on rocks. V. Smirnov. *Trav. inst. pétrog. acad. sci. U. R. S. S.* **6**, 399–412 (1934); *Neues Jahrb. Mineral. Geol.*, Referate II, 1935, 332–3.—Granite, basalt, peridotite and quartz were calcined with Na_2CO_3 in an elec. furnace at 400°, 600° and 800°. Of the rocks granite reacted at the lowest temperature, while peridotite was scarcely attacked. J. F. Schairer

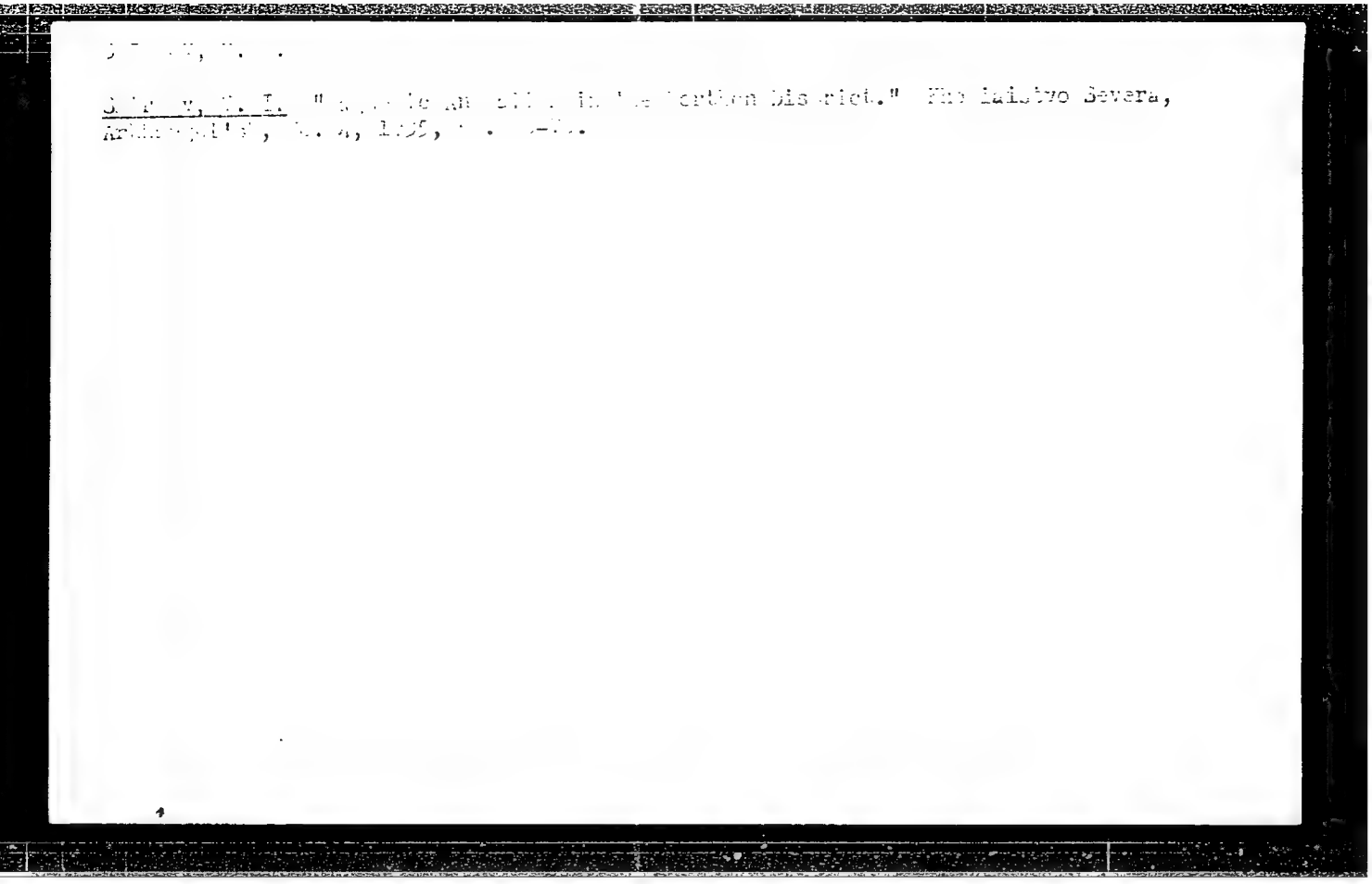


CA

8

The polymetallic ore deposit of Verkhnecie (Tetuhé, Far Eastern Province). V. Smirnov. *Problems Soviet Geol.* 2, 182–90(1933)(English summary); *Neues Jahrb. Mineral. Geol.*, Referate II, 1936, 283–5. Ag-Pb-Zn ore deposits occur along the middle reaches of the Tetyuche River in the Sichota-Alin Mts. (Far East). Numerous analyses give the following mean metal content: Zn 14.51, Pb 9.36, Cu 0.5, Bi 0.019, Cd 0.060, Ag 0.022 and Au traces.
J. F. Schairer

METALLURGICAL LITERATURE CLASSIFICATION

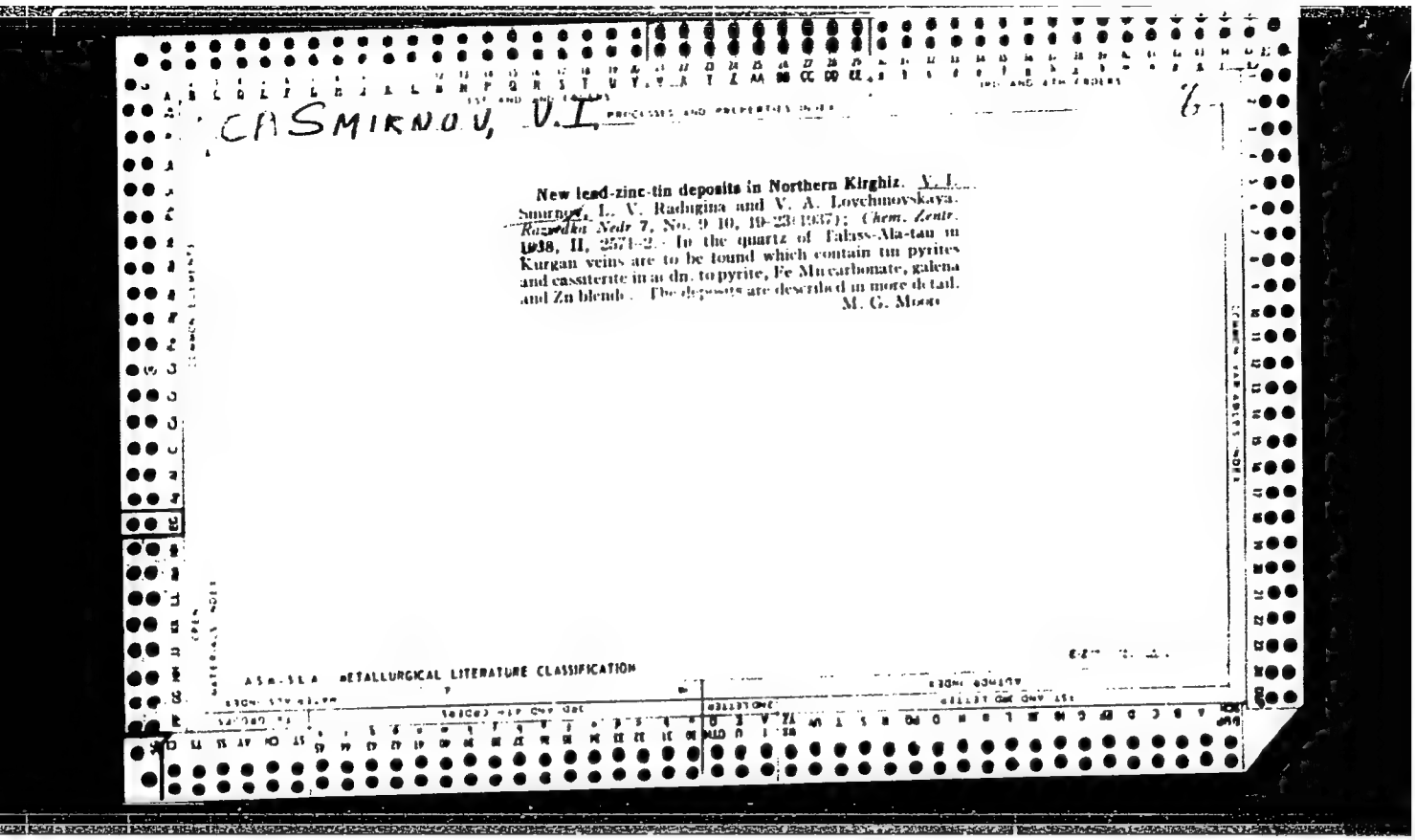


[illegible], V. I.

[illegible], Vladimir Mikhailovich and ZITNOV, V. I. Polimetallicheskiye bary Srednei Azii. Moskva, AN SSSR, 1937. 65 p. (Energetika i poleznye iskopaemye) (Akademiia Nauk Soiuza SSR. Tadzhiksko-Pamirskaia ekspeditsiia. Trudy TP E, no. 83.)
Bibliographical foot-notes.

DLC: TN109.K7

SO: IC, Soviet Geography, Part I, 1951, Uncl.

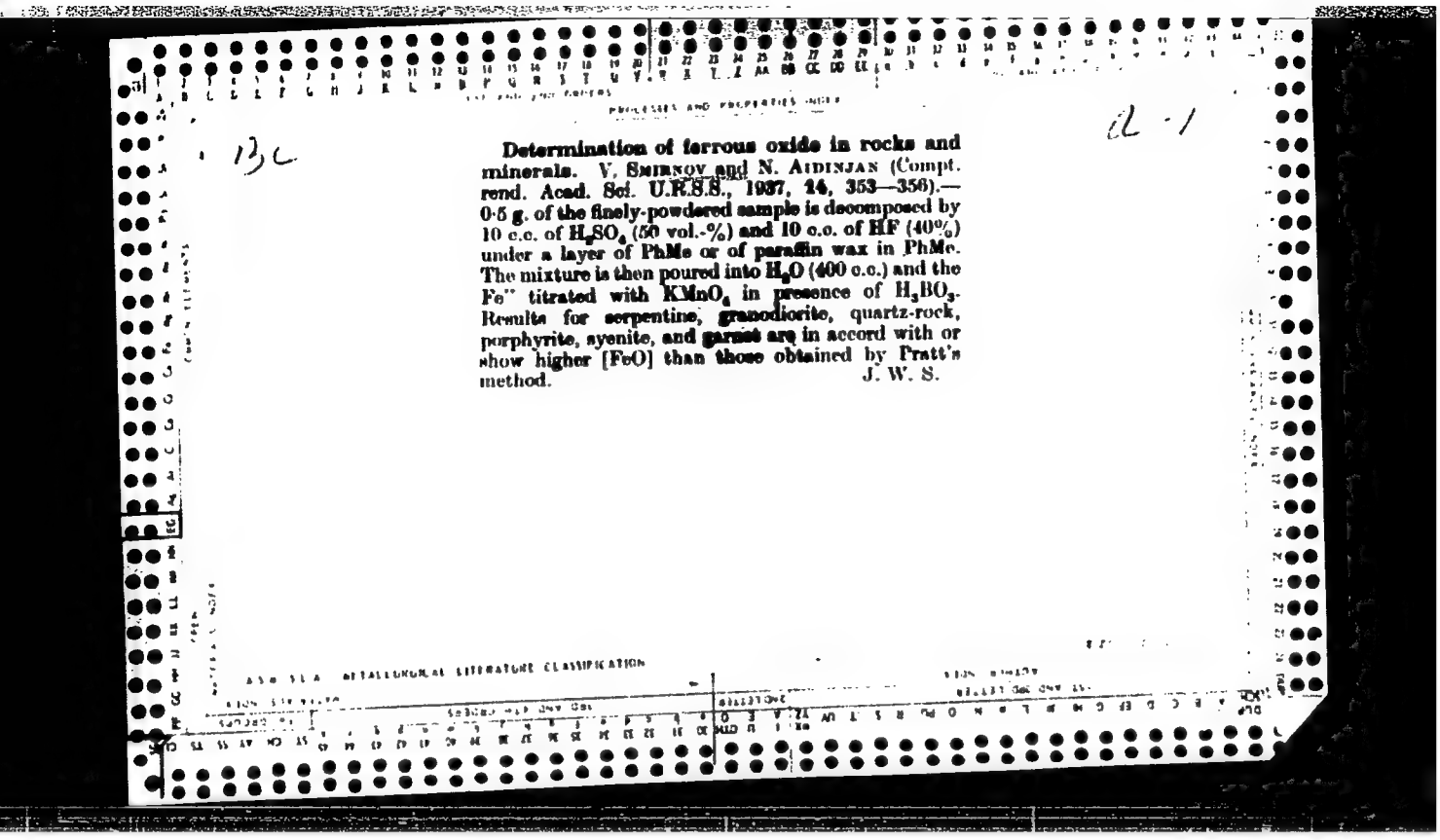


SMIRNOV, V.I.

6

New lead-zinc-tin deposits in Northern Kirghiz. V. I. Smirnov, L. V. Radugina and V. A. Lovchinovskaya. *Razvedka Nedr* 7, No. 9-10, 19-23 (1937); *Chem. Zentr.* 1938, II, 2571-2. In the quartz of Fabass-Ala-tau in Kurgan veins are to be found which contain tin pyrites and cassiterite in addn. to pyrite, Fe Mn carbonate, galena and Zn blende. The deposits are described in more detail.
M. G. Moore

ASM-SLA METALLURGICAL LITERATURE CLASSIFICATION



Determination of ferrous oxide in rocks and minerals. V. SHIBNOV and N. AIDINJAN (Compt. rend. Acad. Sci. U.R.S.S., 1937, **14**, 353—356).—0·5 g. of the finely-powdered sample is decomposed by 10 c.c. of H_2SO_4 (50 vol.-%) and 10 c.c. of HF (40%) under a layer of PhMe or of paraffin wax in PhMe. The mixture is then poured into H_2O (400 c.c.) and the Fe'' titrated with $KMnO_4$ in presence of H_3BO_3. Results for serpentine, granodiorite, quartz-rock, porphyrite, syenite, and garnet are in accord with or show higher [FeO] than those obtained by Pratt's method. J. W. S.

SMIRNOV, VLADIMIR IVANOVICH

Geologiya rtutnykh mestorozhdeniy sredney Azii (Geology of mercury deposits in central Asia) Moskva, Gosgeolizdat, 1947.
78 p. illus., diagrs., tables.
"Literatura": p. 73-78

SMIRNOV, V. I.

USSR/Geological Prospecting 1948
Ore Deposits

"Ore Deposits of the Western Carpathians," V. I. Smirnov, 10½ pp

"Sovet Geolog" No 29

Describes geologic zones of western Carpathians, nature of igneous rock in that region, types of ore deposits, and some of conclusions regarding ore deposits. Under types of ore deposits author discusses paleozoic and tertiary deposits.

[redacted] 69T41

SMIRNOV, V.I.

A case of zonal structure of ore veins. (In: Akademiia nauk SSSR. Voprosy petrografii i mineralogii. Moskva, 1953. Vol. 1, p.235-237)
(MLRA 7:4)
(Ore deposits)

SMIRNOV, V.I.

Study of igneous rocks in prospecting for ore deposits. Vest.Mosk.un. 8 no.8:7-22 Ag '53. (MLRA 6:11)

1. Kafedra poleznykh iskolpyemykh. (Rocks, Igneous)

SMIRNOV, Vladimir Ivanovich; MAKSIMOV, A.A., redaktor; ORLOVA, N.S. tekhnicheskiy redaktor; MIKHAYLOVA, T.A., tekhnicheskiy redaktor

[Geological principles of exploring and prospecting for ore deposits] Geologicheskie osnovy poiskov i razvedok rudnykh mestorozhdenii. [Moskva] Izd-vo Moskovskogo univ., 1954. 546 p. (MLRA 8:3)
(Prospecting)

[illegible], [illegible]

"[illegible] Problems of Computing the [illegible] Raw Materials ([illegible] Critical Comments on the Book Podschet zapasov [illegible] /Computation of the Reserves of Mineral Raw Materials/)," [illegible], No. 3, pp [illegible], 195[illegible]

S[illegible]: [illegible]

SMIRNOV, V I.

USSR/ Geology - Book review

Card 1/1 Pub. 46 - 17/24

Authors : Smirnov, V. I.

Title : New book on the geology of minerals

Periodical : Izv. AN SSSR. Ser. geol. 6, 124-129, Nov-Dec 1954

Abstract : Announcement is made of the publication by the Polish State Geological Institute of a four-volume book entitled, "Mineral Raw Materials of the World," by Karol Bohdanowicz, former professor of the State Mining Academy, Cracov and former director of the Polish State Geological Institute. Two references: 1 Polish and 1 USSR (1864-1954). Table.

Institution : .....

Submitted : May 21, 1954

SMIRNOV, V.I.

G.E.Shchurovskii, the founder of the study of mineral resources in the Moscow University. Biul.MOIP. Otd.geol. 29 no.2:67-76 Mr-Ap '54. (MLRA 7:7)
(Shchurovskii, Grigorii Efimovich, 1803-1890) (Mining schools and education)

POYARKOV, V.E.; BRITAYEV, M.D., redaktor; GERASIMOVSKIY, V.I., redaktor; YERSHOV, A.D., redaktor; KONSTANTINOV, M.M., redaktor; NIFONTOV, R.V., redaktor; SAAKYAN, P.S., redaktor; SMIRNOV, V.I., redaktor; SOLOV'YEV, D.V., redaktor; CHERNOSVITOV, Yu.L.; NIFONTOV, R.V., redaktor; KOSOV, B.M., redaktor; KRASNOVA, N.E., redaktor; GUROVA, O.A., tekhnicheskiy redaktor.

Mercury and antimony. Otsenka mestorozhdenii pri poiskakh i ravedkakh no. 15:3-207 '55. (MLRA 9:3)

(Mercury) (Antimony)

15-57-1-943

Translation from: Referativnyy zhurnal, Geologiya, 1957, Nr 1, p 150 (USSR)

AUTHOR: Smirnov, V. I.

TITLE: The Problems of Prospecting for Ore Deposits Not Exposed at the Surface (Problemy poiskov rudnykh mestorozhdeniy, ne imeyushchikh vykhoda na poverkhnosti zemli)

PERIODICAL: Sov. geologiya, Nr 49, 1955, pp 38-58.

ABSTRACT: Mineral deposits not exposed at the surface include those covered by later formations and those not yet exposed by erosion. The number of such deposits and their reserves, in a number of ore provinces, may considerably exceed the number and reserves of deposits that are exposed at the surface. The number of deposits not outcropping at the surface and the possibility of uncovering them under other equal conditions will be greater the more extensive the vertical range of development of the ore complex, the smaller the ore

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The Problems of Prospecting for Ore Deposits (Cont.)

for the possible occurrence of hidden deposits and for the designation of promising areas. The general order of prospecting for concealed endogenic, principally post-magmatic, deposits in new regions has not yet been treated and can only be indicated in outline. Firstly, by studying large metalliferous regions, definite groups of deposits (ore complexes) should be delineated. Then, within each of such districts, on the basis of studies of known ore fields and deposits, the typical geological environment should be defined: the definite conditions of formation and the discovery of the most characteristic and economically valuable deposits. Further, under similar conditions and within the limits of development of the ore complex, districts with similar geological structure may be distinguished, in the deeper parts of which concealed ore deposits may be found. The differentiation of promising districts may be shown on geologic maps of scales from 1:200 000 to 1:50 000, but such areas are better outlined on geologic maps showing supplemental sections to give precision to these areas and to check the locality. Prospecting surveys may be organized for the differentiated promising areas, to search for concealed deposits, and

SMIRNOV, V.I.

Some problems in the theory of the formation of magmatogenetic ore deposites. Zap.Vses.min.ob-va 84 no.1:97-105 '55.(MLRA 8:5)
(Ore deposits)

LAVROVICH, Nikolay Stepanovich; BRITAYEV, M.D., redaktor; GERASIMOVSKIY, V.I., redaktor; YERSHOV, A.D., redaktor; KONSTANTINOV, M.M.; NIFONTOV, R.V., glavnyy redaktor; SAAKYAN, P.S., redaktor; SMIRNOV, V.I., redaktor; SOLOV'YEV, D.V., redaktor; CHERNOSVITOV, Yu.L., redaktor; SOSHNIKOVA, M.S., redaktor vypuska; SERGEYEVA, N.A., redaktor izdatel'stva; AVERKIYEVA, T.A., tekhnicheskiy redaktor.

[Fluorspar; (fluorite).] Plavikovyi shpat (fliuorit). Moskva, Gos. nauchno-tekhn. izd-vo lit-ry po geol. i okhrane nedr, 1956. 133 p. (Otsenka mestorozhdenii pri poiskakh i razvedkakh, no.16). (MLRA 10:9)
(Fluorite)

SMIRNOV, V. I. Pr Geol

"Structures of Endogenic Ore Fields and Deposits," Lomonsov Lectures in 1956, Ves.t. Mosk. U., Physico Math and Natural Sciences Series, 4, No. 6, pp 147-160, 1956, Geology Faculty'

Translation U-3,054,363

SMIRNOV, V.I.

Geological structure of hydrothermal uranium deposits of the world.
Vest.Mosk.un.Ser.biol.,pochv.,geol.,geog. 11 no.2:125-129 '56.
(MIRA 10:10)

1. Kafedra poleznykh iskopayemykh.
(Uranium) (Geology, Economic)

SMIRNOV, V.I.

Geological bases of ore prospecting. Zap.Vses.min.ob-va 85 no.3:448-450 '56. (MLRA 9:11)
(Ore deposits) (Prospecting)

15-57-8-11087

Translation from: Referativnyy zhurnal, Geologiya, 1957, Nr 8, p 137 (USSR)

AUTHOR: Smirnov, V. I.

TITLE: A Book on Mineral Resources of the World by K. I. Bogdanovich (O knige K. I. Bogdanovicha po geologii poleznykh iskopayemykh)

PERIODICAL: Uch. zap. Mosk. un-ta, 1956, Nr 176, pp 241-249

ABSTRACT: In 1953 the Polish National Geological Institute published a monograph Mineral'noye syr'ye mira (Mineral Resources of the World) by K. I. Bogdanovich. The author had not completed the work, and after his death the manuscript materials were arranged and supplemented with recent data. The monograph consists of four volumes containing about 1500 pages. The first two volumes are devoted to metallic and some nonmetallic mineral resources; the third is devoted to the

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15-57-8-11087

A Book on Mineral Resources (Cont.)

theory of mineral resources.
Card 3/3

Z. A. Makayeva

BOUS, A.A.; BRITAYEV, M.D.; GRECHUKHIN, N.A.; KREYTER, V.M., glavnyy red.; SHATALOV, Ye.T., red.; YEROFEYEV, B.N., red.; ZENKOV, D.A., red.; KRASNIKOV, V.I., red.; NIFONTOV, R.V.; SMIRNOV, V.I., red.; KHRUSHCHOV, N.A., red; YAKZHIN, A.A., red.; PROKOF'YEV, A.P., red; NEMANOVA, G.F., red.izd-va; PEN'KOVA, S.L., tekhn.red.

[Prospecting for beryllium, tantalum, and niobium deposits] Razvedka mestorozhdenii berilliia, tantala i niobiia. Moskva, gos. nauchn.-tekh, uzd-vo literatury po geologii i okhrane nedr. 1957 94 p. (Moscow. Vsesoiuznyi nauchno-issledovates'skii institut mineral'nogo syr'ia. Metodicheskie ukazaniia po proizvodstvu geologo-razvedochnykh rabot, no.2). (MIRA 11:3)

(Ore deposits) (Prospecting)

CHERNYSHEV, G.B.; BRITAYEV, M.D.; TARKHOV, A.G.; SHCHERBAKOV, A.V.; KREYTER, V.M., glavnyy red.; SHATALOV, Ye.T. zamestitel' glavnogo red.; YEROFEYEV, B.N., red.; ZENKOV, D.A., red.; KRASNIKOV, V.I., red.; NIFONTOV, P.V., red.; SMIRNOV, V.I., red.; KHRUSHCHOV, N.A., red.; YAKZHIN, A.A., red.; MUKHIN, S.S., red.; AVERKIYEVA, T.A., tekhn. red.

[Prospecting for ferrous metal deposits] Razvedka mestorozhdenii chernykh metallov. Moskva, Gos. nauchno-tekhn. izd-vo lit-ry po geol. i okhrane nedr, 1957. 102 p. (Metodicheskie ukazaniia po proizvodstvu geologo-razvedochnykh rabot, no.11). (MIRA 11:1)
(Iron ores) (Prospecting)

ABDULLAYEV, Khabib Mukhamedovich; SMIRNOV, V.I., redaktor; SEMENOVA, M.V., redaktor izdatel'stva; KRYNOCHKINA, K.V., tekhnicheskiy redaktor

[Dikes and mineralization] Daiki i orudenenie. Moskva, Gos. nauchno-tekhn.izd-vo lit-ry po geol.i okhrane nedr, 1957. 231 p. (Dikes (Geology)) (Petrification) (MLRA 10:7)